

(12) INTERNATIONAL PUBLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
21 May 2004 (21.05.2004)

PCT

(10) International Publication Number
WO 2004/041716 A1

(51) International Patent Classification⁷: **C01B 3/38,**
C10G 2/00

(21) International Application Number:
PCT/GB2003/004622

(22) International Filing Date: 23 October 2003 (23.10.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0225961.2 7 November 2002 (07.11.2002) GB

(71) Applicant (for all designated States except US): **JOHNSON MATTHEY PLC** [GB/GB]; 2-4 Cockspur Street, Trafalgar Square, London SW1Y 5BQ (GB).

Edward, James [GB/GB]; Glebe House, Muirfield Road, Eaglescliffe, Cleveland TS16 9EJ (GB). **FOWLES, Martin** [GB/GB]; 9 Bridge Green, Danby, Nr. Whitby, North Yorkshire YO21 2JQ (GB).

(74) Agents: **GIBSON, Sara, Hillary, Margaret** et al.; Intellectual Property Department, Johnson Matthey Catalysts, P.O. Box 1, Belasis Avenue, Billingham, Cleveland TS23 1LB (GB).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

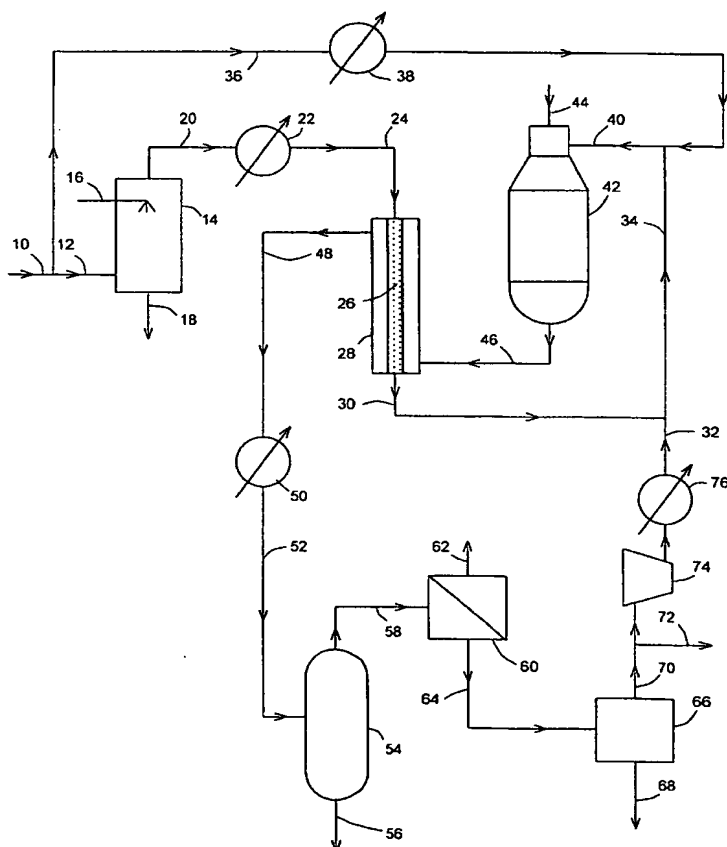
(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),

[Continued on next page]

(72) Inventors; and

(75) Inventors/Applicants (for US only): **ABBOTT, Peter,**

(54) Title: PRODUCTION OF HYDROCARBONS



(57) Abstract: A process for the production of hydrocarbons is described comprising a) subjecting a hydrocarbon feedstock (10) to steam reforming by dividing the feedstock into first (12) and second (13) streams, mixing the first stream with steam (16), passing the mixture of the first stream and steam over a catalyst disposed in heated tubes in a heat exchange reformer (28) to form a primary reformed gas (30), forming a secondary reformer feed stream (40) comprising the primary reformed gas and the second hydrocarbon stream, partially combusting the secondary reformer feed stream with an oxygen-containing gas (44) and bringing the resultant partially combusted gas towards equilibrium over a secondary reforming catalyst, and using the resultant secondary reformed gas (48) to heat the tubes of the heat exchange reformer, thereby producing a partially cooled reformed gas, b) further cooling the partially cooled reformed gas to below the dew point of the steam therein to condense water and separating condensed water (56) to give a de-watered synthesis gas (58), c) synthesising hydrocarbons from said de-watered synthesis gas by the Fischer-Tropsch reaction and separating at least some of the synthesised hydrocarbons, to give a tail gas (70), and d) incorporating at least part of said tail gas into the secondary reformer feed stream before the partial combustion of thereof.



Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— *with international search report*